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Trend Analysis and Research Opportunities in Artificial Intelligence Ethics for Fraud Detection

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ABSTRACT

This study provides a bibliometric analysis of ethical considerations in AI applications for fraud detection based on data from ScienceDirect spanning 2020 to 2024. The analysis identifies "artificial intelligence" as a core focus in the literature, alongside a marked increase in attention to ethical concerns, including data privacy, transparency, and accountability. Additionally, the study reveals progress in applying advanced technologies like blockchain, ChatGPT, and fintech within fraud detection frameworks, which increasingly demand ethical scrutiny. Key findings emphasize the necessity for comprehensive ethical frameworks to ensure transparency, accountability, and public trust in AI-driven fraud detection systems. Practical implications suggest that organizations should prioritize ethical dimensions within AI strategies, enhancing both trust and the effectiveness of detection mechanisms. By using bibliometric analysis, this study finds new trends and gaps in the ethical aspects of using AI to find fraud, which adds new information that hasn't been fully explored in other studies.

ABSTRAK

Studi ini melakukan analisis bibliometrik atas pertimbangan etika dalam aplikasi AI untuk deteksi penipuan berdasarkan data dari ScienceDirect yang mencakup tahun 2020 hingga 2024. Analisis tersebut mengidentifikasi "artificial intelligence" sebagai fokus utama dalam literatur, di samping peningkatan perhatian yang nyata terhadap masalah etika, termasuk privasi data, transparansi, dan akuntabilitas. Studi ini juga mengungkap kemajuan dalam penerapan teknologi terkini seperti blockchain, ChatGPT, dan fintech dalam kerangka kerja deteksi penipuan, yang semakin menuntut pengawasan etika. Temuan utama menekankan perlunya kerangka kerja etika yang komprehensif untuk memastikan transparansi, akuntabilitas, dan kepercayaan publik dalam sistem deteksi penipuan yang digerakkan oleh AI. Implikasi praktis menunjukkan bahwa organisasi harus memprioritaskan dimensi etika dalam strategi AI, meningkatkan kepercayaan dan efektivitas mekanisme deteksi. Studi ini secara unik mengungkap tren dan kesenjangan yang muncul dalam aspek etika aplikasi AI dalam deteksi penipuan melalui integrasi analisis bibliometrik, yang memberikan wawasan yang tidak banyak dieksplorasi dalam studi sebelumnya.

Keywords:
Artificial Intelligence (AI), Bibliometric, Ethics, Fraud Detection.

1. INTRODUCTION

Artificial Intelligence (AI) has become a cornerstone of modern innovation, driving transformative advancements across industries. From autonomous vehicles to AI-based healthcare diagnostics, this technology is reshaping how we live and work by enabling faster, more accurate data analysis and decision-making (Bharadiya et al., 2023; Mehak et al., 2023). In accounting, AI's integration has marked a significant evolution, introducing automation, enhanced decision-making, and powerful tools for forensic accounting and fraud detection (Bunget & Lungu, 2023; Ghouri et al., 2023; Solikin & Darmawan, 2023). However, alongside its potential, the rapid adoption of AI has raised complex ethical concerns, particularly regarding data privacy, algorithm bias, transparency, and accountability (Pulijala, 2024). This study aims to address these challenges by exploring the ethical dimensions of AI in forensic accounting and fraud detection, identifying critical gaps in current practices, and proposing actionable insights to ensure the responsible and trustworthy application of AI in these fields.

Existing bibliometric studies on AI in accounting have primarily concentrated on technological efficiency and forensic applications (Indriani, 2025; Judijanto et al., 2024; Oktavianto & Hardini, 2024; Pattnaik et al., 2024; Syahputri et al., 2024), often neglecting the ethical dimensions that are essential for fostering public trust and ensuring regulatory compliance. This study seeks to bridge this gap by systematically exploring the ethical challenges of AI in fraud detection systems. Unlike prior research, it uniquely combines bibliometric analysis with an emphasis on ethics, offering fresh insights into a relatively underexplored area of AI research.

Using a bibliometric approach, data from ScienceDirect (2020–2024) are analyzed with VOSviewer software to map trends, collaborations, and emerging themes. Early findings reveal significant growth in studies addressing AI ethics; however, practical frameworks and regulations remain inadequate to address these challenges comprehensively. The study highlights the increasing integration of advanced technologies, such as blockchain, ChatGPT, and fintech (financial technology), within fraud detection systems, which further emphasizes the urgency of ethical considerations.

This research makes two key contributions. Theoretically, it provides a detailed mapping of research trends, identifying gaps in ethical frameworks and implementation strategies for AI-driven fraud detection. Practically, it delivers actionable recommendations for policymakers, academics, and practitioners to ensure responsible AI deployment. By focusing on the intersection of AI and ethics in fraud detection, this study advances scholarly discourse while offering a foundation for future interdisciplinary research.

2. LITERATURE REVIEW AND HYPHOTESIS DEVELOPMENT

AI in Forensic Accounting

The use of artificial intelligence (AI) in forensic accounting and auditing marks a significant milestone in the field's recent developments. AI has become central to transforming how we understand and manage audit and fraud detection processes (Ikhsan et al., 2022). Its ability to analyze large datasets quickly and accurately has opened the door to enhanced efficiency in handling the vast volumes of data that auditors and accounting professionals encounter (Collins Kindzeka, 2023). Moreover, AI significantly improves the accuracy and precision of analysis, enabling auditors to identify patterns, trends, and anomalies that might otherwise go undetected manually (Abakah et al., 2023). These advancements have led to more sophisticated fraud detection techniques, responsive to the evolving business environment. Thus, AI's use in forensic accounting and auditing not only boosts operational efficiency but also strengthens fraud detection and prevention capabilities (Fedyk et al., 2022).

Key Impacts of AI in Forensic Accounting

a. Fraud Detection: AI's ability to analyze large datasets rapidly has proven invaluable for identifying patterns and anomalies indicative of fraudulent behavior (Dwivedi et al., 2023). Leveraging machine learning algorithms, AI enhances fraud detection by examining real-time data to identify anomalies signaling potential fraud (Agrawal et al., 2023). Its self-learning capabilities also allow continuous adaptation and improvement, refining fraud detection accuracy over time (Mytnyk et al., 2023).
b. Risk Analysis: AI, through machine learning algorithms, analyzes historical data to establish normal transaction patterns and financial behaviors. Deviations from these patterns are automatically flagged as potential fraud. By studying historical data, AI builds predictive models that assess fraud likelihood based on variables like transaction location and frequency (Kim et al., 2024; Ruchay et al., 2023).
c. Efficient Transaction Monitoring: AI plays a crucial role in monitoring large transaction volumes in real time, enabling the immediate detection of suspicious activities (Han et al., 2023). Capable of processing millions of transactions per second without performance degradation, AI is essential for financial institutions managing high transaction volumes daily (Chen, 2023).
d. Decision-Making: AI has revolutionized forensic accounting and audit decision-making by enhancing data processing and analysis capabilities. Its implementation in auditing enables professionals to process large datasets, identify complex patterns, and derive deep insights, thereby improving the accuracy and effectiveness of financial investigations (Owonifari et al., 2023). AI tools like data mining, machine learning, and image recognition have positively impacted audit practices,

allowing auditors to predict trends and make informed decisions (Collins Kindzeka, 2023).

e. Automation: AI plays a vital role in automating data collection from various sources, such as financial systems, databases, and electronic documents, streamlining the audit process. It automates audit report creation and organizes findings into an accessible format, increasing auditor efficiency in communicating investigation results (Collins Kindzeka, 2023). Auditors generally perceive AI as a tool to enhance the efficiency, effectiveness, and overall impact of audit procedures.

Development of Ethical AI Regulations

United States of America

On October 4, 2022, the White House Office of Science and Technology Policy released the Blueprint for the Development, Use, and Deployment of Automated Systems (also known as the Blueprint for an AI Bill of Rights). This blueprint outlines five non-binding principles aimed at reducing potential harm from AI systems (Dwivedi et al., 2023). Additionally, on August 18, 2022, the National Institute of Standards and Technology (NIST) published a second draft of its AI Risk Management Framework. The initial version, released in March 2022, was based on a draft from December 2021. This framework provides voluntary guidelines to help companies developing or deploying AI systems assess and manage associated risks. Although the framework offers recommendations, it is non-binding and is not explicitly intended as regulation (Lupo, 2023).

China

In 2017, China's State Council launched the Next Generation Artificial Intelligence Development Plan to accelerate AI technology advancement. Following this, in 2021, the Chinese government introduced ethical guidelines for AI management, underscoring the country's commitment to addressing the ethical challenges posed by rapid AI development (Denault et al., 2020). In January 2022, China enacted two laws targeting specific AI applications, with the Algorithm Provisions taking effect in March 2023. The Draft Deep Synthesis Provisions are currently in progress, indicating China's ongoing regulatory efforts to establish ethical AI standards. These initiatives reflect China's proactive approach to AI regulation, aligning with global conversations on responsible AI use (Fisher & Fisher, 2023; Shen & Liu, 2022).

UNESCO

UNESCO's Recommendation on the Ethics of Artificial Intelligence, adopted by all 193 Member States in November 2021, represents the first global standard addressing ethical principles for AI development and use. This recommendation demonstrates global awareness of the need for clear ethical guidelines amidst AI's rapid evolution (UNESCO, 2021). It provides a comprehensive framework covering transparency, fairness, responsibility, and human rights protection, aiming to guide nations toward ethically aligned AI

applications while honoring universal values and individual rights. UNESCO emphasizes four core values: (1) respect, protection of human rights, and human dignity; (2) fostering a peaceful, just, and connected society; (3) maintaining a thriving environment and ecosystem; and (4) promoting diversity and inclusivity. Furthermore, UNESCO's 10 core principles for fundamental human rights in AI include (1) proportionality and non-harm, (2) security and safety, (3) privacy rights and data protection, (4) multi-stakeholder governance and adaptive collaboration, (5) responsibility and accountability, (6) transparency and explainability, (7) human oversight, (8) sustainability, (9) awareness and literacy, and (10) fairness and non-discrimination (UNESCO, 2023).

3. RESEARCH METHODS

This research employs a bibliometric approach to analyze publication trends on ethical dilemmas and biases in fraud detection. Through this approach, the study aims to identify publication patterns, uncover frequently emerging themes, and evaluate key contributors in this field. Additionally, the research seeks to identify future research opportunities by highlighting gaps in the literature and proposing new directions for further exploration.

The data for the bibliometric analysis will be collected from the Scopus database via the ScienceDirect website, a trusted and comprehensive source of peer-reviewed scientific information. ScienceDirect is chosen for its reputation as a leading database across diverse fields, including AI, ethics, and accounting, and its integration with Scopus facilitates efficient bibliometric analysis. Its comprehensive collection of high-quality, full-text publications and regular updates make it ideal for tracking recent trends in AI ethics and fraud detection systems. The study focuses on publications from 2020-2024 to capture the most current and impactful research, reflecting critical advancements such as the integration of blockchain and ChatGPT into fraud detection frameworks and the increasing emphasis on regulatory and ethical considerations in AI deployment. This approach ensures the analysis remains relevant, avoids outdated perspectives, and aligns with ongoing discussions in the field of AI ethics.

This study adopts the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) 2020 methodology (Page et al., 2021), which involves three main stages:

a. Identification: This stage involves systematically searching databases, registers, and other sources to identify relevant studies. Duplicate records are removed, and all potential studies are collected for further evaluation. Tools or automation may also be used to streamline this process.
b. Screening: At this stage, the identified studies are assessed based on predefined inclusion and exclusion criteria. The titles and abstracts of the studies are reviewed to ensure they meet the study's objectives. Records that do not meet the criteria are excluded, and reasons for exclusion are documented.

c. Included: In the final stage, studies that pass the screening process are thoroughly examined for eligibility. Full-text reviews are conducted to confirm their relevance and quality. These selected studies are then included in the systematic review or meta-analysis, and their data are synthesized and analyzed.

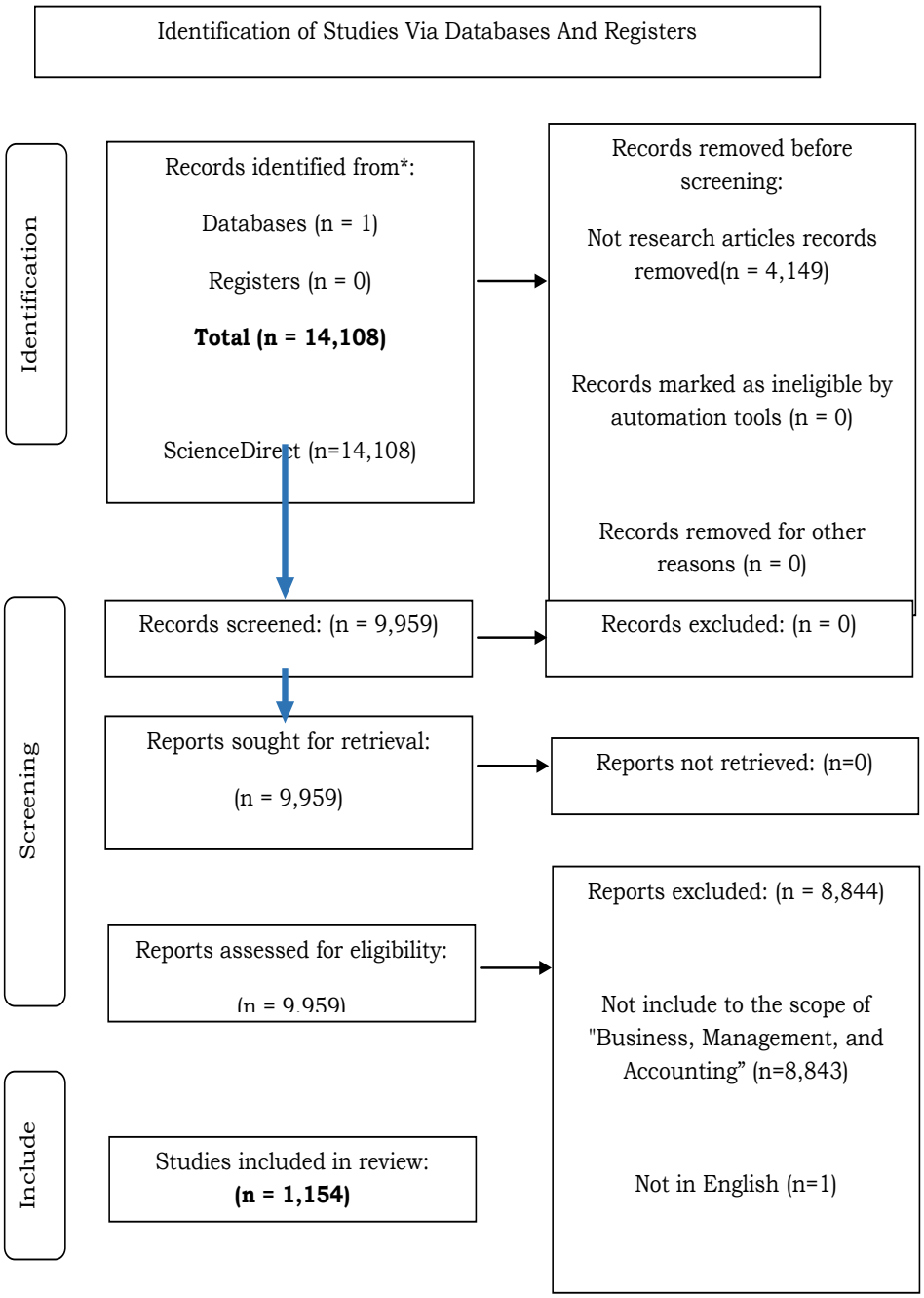

Figure 1
PRISMA Flow Diagram

The initial step in this research involved a data search on the ScienceDirect website using the keyword "Ethics on Artificial Intelligence for fraud detection" for the period of 2020-2024. This search resulted in 14,108 related topics. The data was then filtered to include only "research articles," resulting in 9,959 articles meeting the research criteria. This search and filtering process was conducted on May 20, 2024, and was essential in defining the research framework and establishing a relevant literature base for further analysis on the ethics of AI in fraud detection.

Next, the data screening step was undertaken to verify the suitability of the data with the defined research focus. This screening process is crucial to ensure that only data relevant to the research focus is considered for further analysis. In this stage, the authors filtered articles within the scope of "Business, Management, and Accounting," narrowing the selection to 1,155 articles. Non-English articles were subsequently eliminated, resulting in 1,154 articles.

In the final stage, after screening, the authors retained 1,154 articles relevant to the research theme. These articles were then saved in .RIS format for further analysis using the VOSviewer application, enabling in-depth bibliometric data visualization. These steps are crucial for gaining a comprehensive understanding of the impact and distribution of relevant research within the chosen domain.

4. RESULTS AND DISCUSSION

Publication Trends

Figure 2 visualizes the total publication trends concerning the ethical dilemmas of applying artificial intelligence in fraud detection. The data presented reveals a significant upward trend in research on the ethical dilemmas of AI applications in fraud detection over the past five years. The number of studies has been rising annually, reflecting growing interest and increased attention to this issue within academic and industrial communities. In 2020, 135 studies were conducted on this topic. This number rose to 202 studies in 2021, indicating a substantial surge in interest.

This upward trend continued, with 225 studies published in 2022. In 2023, this number increased drastically, with 335 studies published-almost tripling the figure from 2020. This growth highlights the rising importance of ethics in AI, especially concerning fraud detection.

Notably, in the first half of 2024 alone, 257 studies have already been published. This figure shows that the number of studies in 2024 has reached more than 75% of the total studies in 2023, despite the year not yet being over. This trend suggests that interest in this topic continues to accelerate, with projections indicating that the total number of studies by the end of 2024 may exceed those of previous years.

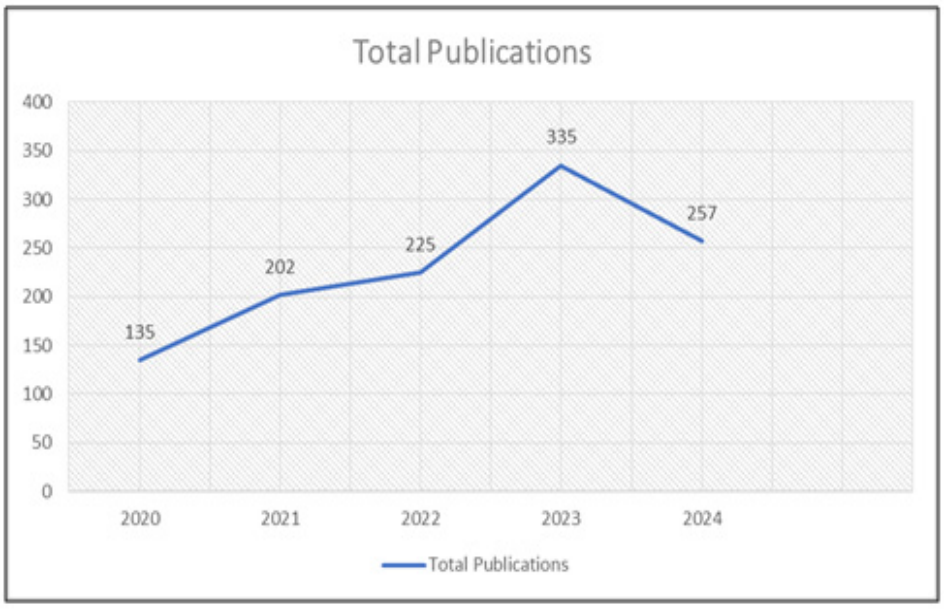

Figure 2
Publication Trends each Year
Source: Data Processed

The substantial increase in studies reflects heightened awareness of the ethical issues related to using AI in fraud detection. This interest may be driven by the development of regulations and ethical guidelines issued by various countries and international organizations in recent years. Major nations, including the United States and China, alongside organizations like UNESCO, have started to issue regulations and guidelines underscoring the importance of ethics in AI development and application.

Overall, this data demonstrates that research on the ethical dilemmas surrounding AI use in fraud detection is not only important but also increasingly relevant and urgent. This research is expected to offer deeper insights into the responsible and ethical use of AI, informing future policy development and best practices. With growing awareness of these issues, it is anticipated that the rising trend in studies will continue, making significant contributions to both academic literature and practices.

Author Network Visualization

Figure 3 presents a collaboration network visualization of authors generated using VOSviewer, illustrating collaborative relationships from 2020 to 2024. In this diagram, each node represents an author, while connecting lines reflect the extent of collaboration among them. This visualization offers a clear overview of academic cooperation patterns in research on AI ethics in fraud detection, highlighting key contributors in the field and revealing their interconnections.

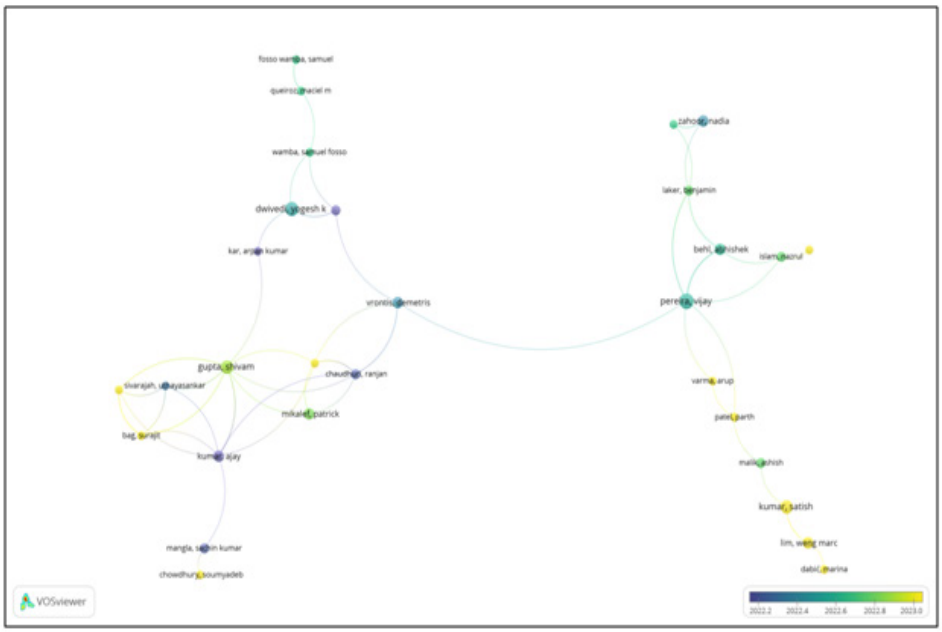

Figure 3
Co-Authorship Results (Overlay Visualization)
Source: Data Processed

The visualization clearly indicates that Pereira Vijay is a prominent contributor to research on AI ethics in fraud detection. Pereira has collaborated extensively with other authors, such as Behl Abhishek, Vrontis Demetris, and Varma Arup. These collaborations underscore Pereira Vijay's central role in this research network, highlighting their influential contributions to advancing related studies.

The second author demonstrating substantial collaboration is Dwivedi Yogesh, who has worked with Wamba Samuel Foso and Vrontis Demetris. This collaboration signifies that Dwivedi Yogesh is also a key figure in the network, significantly contributing to knowledge advancement and the dissemination of findings on AI ethics in fraud detection.

Additionally, a new research cluster emerging in 2023, visualized by the yellow-colored block, indicates the involvement of new researchers in this field. This cluster includes researchers such as Gupta Shivam and Varma Arup, suggesting that research on AI ethics in fraud detection continues to grow and attract interest from emerging scholars. The presence of this new cluster also reflects the field's dynamics and growth, underscoring its increasing relevance and importance in both academic and industry discussions.

Keyword Network Visualization

Figure 4 depicts a visualization network of interrelated keywords in research generated by the VOSviewer software. This network map illustrates the relationships among various research topics in the field of artificial intelligence (AI) ethics from 2020 to 2024. The size of nodes indicates the frequency of keyword usage, while connecting lines indicate relationships or collaborations between these topics.

The topic of "artificial intelligence" holds a central position with the largest node in the visualization, indicating it is the most frequently discussed and serves as the focal point for many related studies. Surrounding it are topics such as "ethics," "machine learning," "sustainability," and "digital transformations," which also have large nodes, signifying their high importance and frequency in the literature.

There are strong connections between "artificial intelligence," "ethics," and "machine learning," suggesting that many studies are integrating ethical principles to address issues like data privacy and algorithmic bias. This demonstrates that ethics in AI is not only a theoretical topic in academic circles but also applied in practical contexts to tackle real-world challenges in AI technology.

Research linking "artificial intelligence," "ethics," and "machine learning" also involves efforts to develop transparent and accountable technology. This means that AI algorithms are increasingly being designed so that their decisions can be explained and audited, fostering greater public trust. Transparency and

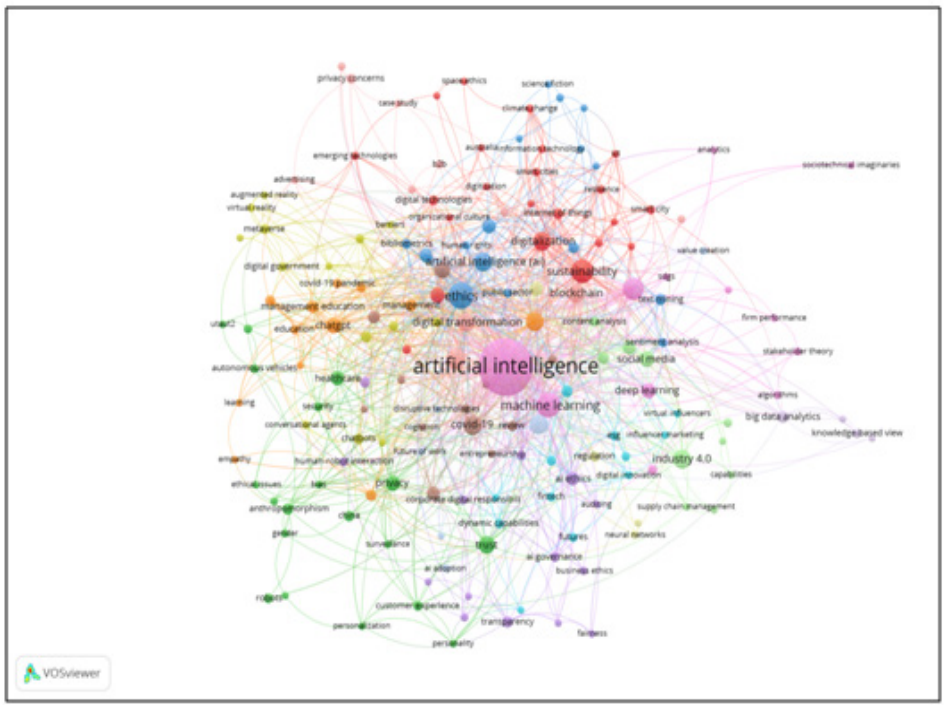

Figure 4
Co-Occurrence Results (Network Visualization)
Source: Data Processed

accountability are essential ethical principles in AI use, as they help prevent misuse and ensure technology is employed for the greater good.

The visualization also shows the emergence of new topics related to AI ethics, such as “trust” and “privacy.” As AI technology advances, these aspects are receiving increasing attention. Trust is especially crucial, as widespread AI adoption requires public confidence that systems operate fairly, transparently, and reliably. Trust in AI encompasses various factors, including transparency in algorithm operations, the accuracy of generated results, and the interpretability of AI decisions.

The resulting map of research development on AI ethics in fraud detection from 2020 to 2024 reveals how focus and intensity in this field have evolved over time. Colors on the graph represent the temporal distribution of research, with dark blue indicating studies from 2020 and yellow highlighting more recent studies up to 2024. This visualization provides insight into shifting trends and growing interest in AI ethics within fraud detection, identifying key areas of concentrated scholarly contributions. This map not only illustrates the rising volume of research but also highlights specific areas of focus, offering a valuable overview of how the understanding and application of ethics in AI technology have progressed during this period.

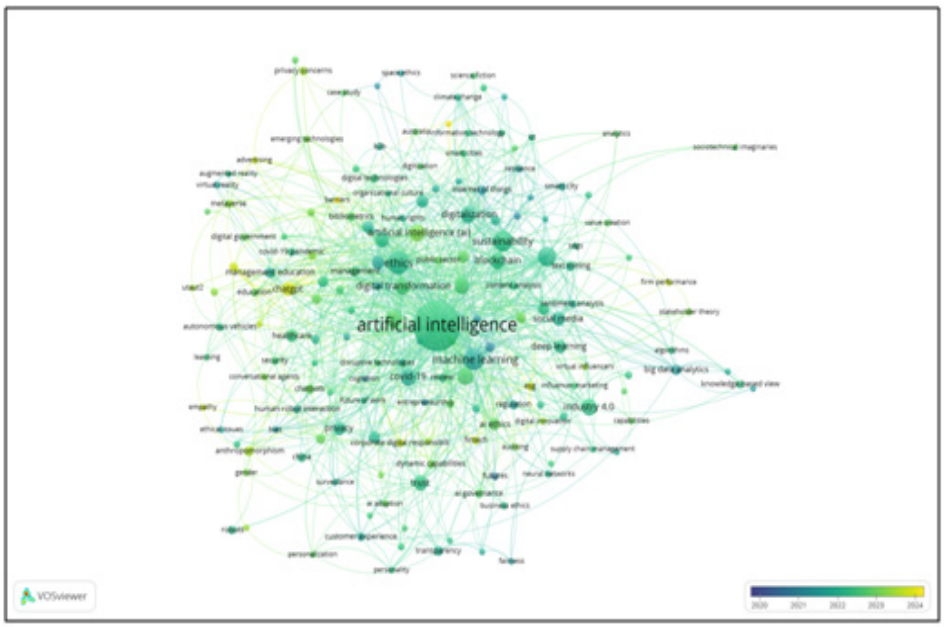

Figure 5
Co-Occurrence Results (Overlay Visualization)
Source: Data Processed

During the initial period from 2020 to 2021, research in the field of AI ethics for fraud detection was still general and not yet extensive. Keywords that emerged during this phase include terms such as “Internet of Things,” “machine learning,” and “entrepreneurship.” This indicates that the research focus was still on basic understanding and the initial application of AI technology in broader contexts. Researchers during this period appear to be exploring how ethical principles can be applied to this emerging technology, as well as how the technology can be utilized in various business and entrepreneurial aspects. However, the intensity and volume of research were still relatively low, indicating that this topic was still in the early development and exploration phase.

In the period of 2022–2023, research on AI ethics for fraud detection began to show more specific and focused developments. Technical keywords such as “blockchain” began to emerge, indicating increased interest in technologies that can enhance security and transparency in AI systems.

Additionally, ethical principles began to receive greater attention, as seen by the emergence of keywords such as “ethics,” “trust,” “privacy,” and “sentiment analysis.” These topics reflect growing concerns about how AI technology can be used ethically, with an emphasis on protecting data privacy and building user trust. “Sentiment analysis” indicates efforts to understand and assess human opinions and feelings toward AI systems, which are crucial to ensuring that the implementation of this technology is not only effective but also well-received by society. Research during this period began to move from mere exploration of technology to more responsible and ethical applications, reflecting a deeper understanding of the social and ethical implications of using AI in fraud detection.

In the most recent period, from 2023 to 2024, research began to focus on more technical and cutting-edge topics. Trends in research titles indicate increased interest in advanced technologies such as “Chat GPT,” “ESG” (Environmental, Social, and Governance), “Metaverse,” and “Fintech.” The “Chat GPT” topic reflects growing interest in the use of large language models for various applications, including fraud detection and sentiment analysis. “ESG” indicates attention to how artificial intelligence can be used to meet sustainability and social responsibility standards in a business context. “Metaverse” and “Fintech” reflect explorations of the virtual world and digital financial innovation, which are increasingly relevant in the era of rapid digital transformation.

These research titles indicate that researchers are not only interested in the application of existing AI technology but also in the future potential and how this technology can be enhanced and integrated into various aspects of life. The focus on these topics also reflects efforts to address emerging ethical challenges associated with technological advancements, ensuring that innovations are not only effective but also aligned with ethical values and social responsibilities.

Discussion

Opportunities for Future Research

From the previous visualizations, it can be seen that there are several research scopes with great potential for development that are still underexplored. These areas include ethical issues in AI, AI regulation, and advanced AI applications.

Ethical Issues in AI

Research on ethical issues in AI remains very limited, despite the growing importance of this topic as AI technology is increasingly utilized across various fields. Issues such as algorithm bias, data privacy, transparency, accountability, and security are becoming more urgent and require further investigation. Given the significant impact of AI-based decisions, in-depth studies on addressing these ethical challenges could provide much-needed guidance for AI developers and users. In line with the findings of Lami et al. (2024), which highlight the inadequacy of specific AI regulations. Sahoo (2024) also emphasizes the need for transparency, fairness, and accountability in AI's role in data privacy. This underscores the urgency of addressing ethical concerns such as algorithm bias and data privacy as AI technology continues to evolve.

AI Regulation

In previous visualizations, it was evident that AI regulation is a prominent topic in research, particularly with the use of keywords such as "regulation" and "AI governance." This indicates that regulating and managing AI has become a central focus in efforts to control the development and implementation of artificial intelligence technology. Research using these keywords often explores various aspects of AI regulation, including government policies, industry standards, technology ethics, consumer protection, and the social implications of AI use. A better understanding of how AI regulation and governance evolve provides valuable insights into the development and trends in managing this increasingly critical technology. Research conducted by Constantinides et al. (2024) contributes to this understanding by compiling a dataset of laws and policies focused on AI, addressing risks, governance strategies, and compliance incentives. This resource is vital for analyzing the evolving AI regulatory landscape, offering key trends and insights to manage AI development and implementation effectively. Additionally, another study by Arnold et al. (2024) emphasizes the importance of anchoring responsible AI guidelines in existing regulations, highlighting the dynamic AI governance landscape, such as the EU AI Act and the US AI Bill of Rights, which shape ethical considerations and industry standards in AI development.

Advanced AI Applications in Fraud Detection

Advanced AI applications involve exploring new technologies and methodologies that can enhance the performance and efficiency of AI, particularly in the context of forensic accounting and fraud detection (Malladhi, 2023). Methods such as "blockchain," "chat GPT," "fintech," "ESG," and auditing are the main focus of this

research. The use of blockchain in data storage and verification, as well as the application of chat GPT technology in text analysis and human-machine interactions, are intriguing aspects to consider (Pratt &Otero, 2024). Additionally, the role of fintech and ESG principles in enhancing transparency and sustainability is also a primary focus (Rerung et al., 2024). It is expected that further research in the field of AI technology will make a significant contribution to the development of forensic accounting practices, strengthening the ability to detect and prevent fraudulent activities more effectively and efficiently.

5. CONCLUSIONS AND SUGGESTIONS

This study aims to examine the ethical dilemmas surrounding the application of artificial intelligence (AI) in fraud detection over the past five years (2020–2024). The findings reveal a significant increase in academic and industrial interest in this area, demonstrating the growing recognition of the importance of ethical considerations in AI deployment. While the field is still in its early stages with limited foundational references, the research highlights the potential for ensuring responsible and ethical use of AI, particularly in fraud detection—a critical component in safeguarding industries against financial crimes.

The primary contribution of this research lies in mapping trends and identifying critical ethical issues in AI, such as algorithm bias, data privacy, transparency, trust, and accountability. Theoretically, it advances understanding by highlighting gaps in existing frameworks and implementation strategies for fraud detection systems and integrating ethical considerations into AI governance and deployment. By examining the intersection of ethics and advanced technologies, such as blockchain, ChatGPT, fintech, and ESG frameworks, this study underscores the role of these innovations in enhancing AI's reliability and efficiency. Practically, it provides actionable insights for policymakers, AI developers, and forensic accountants by emphasizing the need for robust regulations and ethical guidelines to address emerging challenges, fostering public trust and regulatory compliance. Additionally, it offers forensic practitioners a roadmap for responsibly leveraging advanced AI technologies to improve fraud detection accuracy and efficiency while maintaining ethical standards. By bridging theoretical and practical perspectives, this study supports the development of ethical and sustainable AI applications in critical fields like forensic accounting and lays the foundation for future interdisciplinary research.

Despite its contributions, this study has limitations. The analysis focuses primarily on bibliometric trends, which might overlook qualitative aspects of the ethical challenges in AI. Future research should delve deeper into real-world case studies, explore region-specific regulations, and assess the long-term societal impacts of AI in fraud detection. Additionally, further studies are needed to develop comprehensive frameworks for ethical AI implementation and evaluate advanced applications in diverse

industry contexts. These efforts will strengthen the ability to detect and prevent fraud more effectively and responsibly.

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